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ZOOLOGY

Palms and Soles.— Dr. Schlaginhaufen of Dresden has written a brief description of the palms and soles of man and the apes, based upon a literature of one hundred and fourteen publications.[1] The volar surface of the hand and fingers, and the plantar surface of the foot and toes are thickly covered with slender ridges, the *cristae cutis,* separated from one another by depressions, the *sulci cutis.* Along the summit of a ridge, a row of sweat glands opens. A primitive stage in the formation of the ridges is seen in the Prosimiae, which have small round elevations (*insulae primariae*) surrounding single sweat pores. Besides these primary islands there are larger elliptical forms on which several sweat pores may be arranged in a circle or ellipse, surrounding a central depression. These *lenticular islands* are due to the coalescence of primary islands radially arranged. A crista is formed by the coalescence of a linear series. The *minutiae* of the cristae, upon which personal identification depends, consist in the branches of the ridges, which may end blindly or anastomose; in detached ridges; and in the ridge patterns. The two principal patterns are the more or less concentric *tactile figures,* and the Y shaped groups called *triradii.*

Besides the bas-relief of cristae, palms and soles present the high relief of tactile cushions, *toruli tactiles.* For each extremity there are typically five *digital cushions* at the tips of the fingers or toes; four *interdigital cushions* near the metacarpo- or metatarso-phalangeal joints; and two or three proximal cushions,— a tibial and an elongated fibular, or a radial and two ulnar, one behind the other. This arrangement is typical for pentadactylous mammals and the cushions are well developed in marsupials, rodents, the insectivora and primates. Often the interdigital cushions fuse, as in the cat, and that between the thumb and fingers may be suppressed. Secondary cushions are not infrequent — such as a central cushion found in Cebus — but none occur in the anthropoid apes or in man. Cushions are accumulations of connective tissue and are not to be confounded with eminences due to underlying muscles. On the summits of the cushions the complex tactile figures occur, and between them are the triradii and imperfectly formed cristae. The distribution of the triradii in the monkeys and various races of men has been elaborately plotted, showing among other things, the shifting which accompanies the altered function of the foot.

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[1] Schlaginhaufen, O. Über das Leistenrelief der Hohlhand- und Fusssohlen-Fläche der Halbaffen, Affen und Menschenrassen. *Ergebn. d. Anat. u. Entw.,* vol. 15, pp. 628–662. Since writing this review, the editor has received the announcement of the following book. Kidd, W. *The sense of touch in mammals and birds with special reference to the papillary ridges.* London, A. and C. Black, 1907. 8vo., 174 figs. 5s.

According to Whipple the cushions are essentially walking pads which are secondarily tactile. The cristae have been designated 'friction ridges' since they have been supposed to allow a firmer grasp. An area of furrowed skin has been found on the prehensile tail of Alouatta (Mycetes). The German writers, however, including Schlaginhaufen, regard the cushions as primarily tactile. The most highly developed pads (the digitals) are the most sensitive; the interdigitals are less sensitive; and the low tarsal and carpal cushions least of all. The sensory functions of the toruli, whether primary or secondary, have been demonstrated by various experiments with compass points.

F. T. L.

Literature of Ichthyology. In the Proceedings of the United States National Museum for 1906, (vol. XXXI) are numerous papers on fishes, most of them relating to the fauna of Japan. Jordan and Starks give an elaborate review of the Japanese flounders and soles, 60 species in all. Jordan and Herre discuss the herring-like fishes, and Jordan and Snyder the killifishes. Jordan and Starks give a record of the fishes collected by Prof. J. F. Abbott at Port Arthur, and Hugh M. Smith and Thomas E. B. Pope record the fishes obtained in Japan by Dr. Hugh M. Smith in 1903. Among these are four new genera, *Tosana, Satsuma, Lysodermus,* and *Lambdopsetta.*

Evermann and Goldsborough describe a new rock-fish, *Sebastodes alexandri,* from California; Evermann and Kendall, a collection of fishes from Argentina; and Evermann and Seale, a collection from the Philippines made by Major Edgar S. Mearns.

In the Proceedings of the United States National Museum for 1907, (vol. XXXII), Jordan and Starks describe a collection of fishes from Santa Catalina Island, California.

Among these are *Germo macropterus*, the yellow-fin Albacore, heretofore known from Japan and Hawaii; *Tetrapterus mitsukurii,* the Marlin-spike fish, heretofore known from Japan; *Lepidopus xantusi,* known from Cape San Lucas; *Chænopsis alepidota,* known from the Gulf of California; and *Luvarus imperialis,* known from the Mediterranean. New species are *Starksia holderi* and *Antennarius avalonis.*